

***BOISDUVALIA*, A COMA-LESS *EPILOBIUM* (ONAGRACEAE)**

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ABSTRACT

Evidence from independent analyses of morphological and molecular variation in tribe Epilobieae shows no support for the continued recognition of *Boisduvalia* Spach. Absence of seed comas, the only consistent diagnostic feature of the genus relative to *Epilobium*, now appears to be a secondary loss; other characters reveal a close relationship of *Boisduvalia* to taxa within *Epilobium*. Therefore, all species of *Boisduvalia* are transferred to *Epilobium*, in order better to reflect phylogeny.

KEY WORDS: Onagraceae, *Epilobium*, *Boisduvalia*, New World

Tribe Epilobieae (Munz 1965; Raven 1976) is marked within Onagraceae as monophyletic by probable base chromosome number of $x = 9$ (Raven 1976, 1979), commissural stigmas (Eyde 1982), and dry type stigma surface (Heslop-Harrison 1990); most species (excluding mainly *Epilobium* sect. *Chamaenerion*) also have pollen released in tetrads (Skvarla *et al.* 1978). The tribe traditionally has comprised *Epilobium* (including sections *Chamaenerion* and more recently *Zauschneria*), characterized by the synapomorphy of seed comas (tufts of hair on the chalazal end of the seed), and *Boisduvalia* (Raven & Moore 1965), an entirely annual genus that lacks comas. Recent phylogenetic analyses of the tribe using either morphological data (Hoch & Crisci, in prep.) or variation in chloroplast DNA (Baum *et al.*, in prep.) have revealed relationships among the taxa that are not reflected in the current taxonomy. Even though the exact relationships proposed among the taxa differ between these two studies, both demonstrate convincingly that recognition of *Boisduvalia* as a genus is not supported and that continuing to recognize it renders *Epilobium* paraphyletic.

These studies strongly suggest that *Boisduvalia* evolved from taxa with a coma. By analogy in support of that suggestion, two species of *Epilobium* and populations of a third have secondarily lost their comas (Munz 1965; Raven

& Raven 1976; Seavey *et al.* 1976). Other characters that mark species or groups of species in *Boisduvalia* include capsule specializations and seed shape, but these may be associated with the loss of the coma and may be viewed more accurately as apomorphies within the group, rather than plesiomorphies within the tribe. Consequently, we here propose that *Boisduvalia* be placed in synonymy with *Epilobium*, and make the necessary nomenclatural changes, in order to make the names available for floristic treatments in progress.

The following nomenclatural changes include only names relevant to the transfers. For more complete synonymy of *Epilobium* and the sections, see Raven (1976); for complete synonymies of all species being transferred from *Boisduvalia*, see Raven & Moore (1965).

Epilobium L., *Sp. Pl.* 347. 1753.

Epilobium sect. **Boisduvalia** (Spach) Hoch & Raven, *comb. nov.* **BA-SYNONYM:** *Boisduvalia* Spach, *Hist. Nat. Vég.* 4:383. 1835. *Oenothera* L. sect. *Boisduvalia* (Spach) Torr. & A. Gray, *Fl. N. Amer.* 1:505. 1840. *Oenothera* group *Boisduvalia* (Spach) H. Lév., *Monogr. Oenothera* 296. 1908. **TYPE:** *Epilobium concinnum* (D. Don) Hoch & Raven.

1. **Epilobium concinnum** (D. Don) Hoch & Raven, *comb. nov.* **BA-SYNONYM:** *Oenothera concinna* D. Don in Sweet, *Brit. Fl. Gard.* II, pl. 183. 1833. *Boisduvalia concinna* (D. Don) Spach, *Hist. Nat. Vég.* 4:384. 1835. *Oenothera subulata* (Ruiz & Pavón) H. Lév. race *concinna* (D. Don) H. Lév., *Monogr. Oenothera* 298. 1908. **TYPE:** Sweet, *Brit. Fl. Gard.* II, pl. 183. 1833; plant raised from seeds sent from Chile by H. Cuming (LECTOTYPE, designated by Raven & Moore [1965]).

Boisduvalia subulata (Ruiz & Pavón) Raim. in Engl. & Prantl, *Nat. Pflanzenfam.* III. 7:212. 1893. *Oenothera subulata* Ruiz & Pavón, *Fl. Peruv. Prodr.* 3:82, pl. 316. 1802; non *Epilobium subulatum* (Hausskn.) Rydb., 1913.

2. **Epilobium densiflorum** (Lindl.) Hoch & Raven, *comb. nov.* **BA-SYNONYM:** *Oenothera densiflora* Lindl., *Bot. Reg.* 19: pl. 1593. 1833. *Boisduvalia douglasii* Spach, *Hist. Nat. Vég.* 4:385. 1835, pro syn. *Boisduvalia densiflora* (Lindl.) S. Watson, *Bot. California* 1:233. 1876. **TYPE:** Lindl., *Bot. Reg.* 19: pl. 1593. 1833; plant raised from seeds sent from "Northern California" by Douglas in 1831 (LECTOTYPE, designated by Raven & Moore [1965]).

3. **Epilobium pallidum** (Eastwood) Hoch & Raven, *comb. nov.* BASIONYM: *Boisduvalia pallida* Eastwood, *Leafl. W. Bot.* 2:54. 1937. TYPE: U.S.A. California: Modoc Co., Goose Valley, George Dillman Ranch, 11 July 1912, *Eastwood 1021* (HOLOTYPE: CAS 243301; Isotypes: GH,POM,US).

Boisduvalia macrantha A. Heller, *Muhlenbergia* 2:101. 1905; non *Epilobium macranthum* Hook., 1840.

4. **Epilobium torreyi** (S. Watson) Hoch & Raven, *comb. nov.* BASIONYM: *Oenothera torreyi* S. Watson, *Proc. Amer. Acad. Arts* 8:600. 1873. *Boisduvalia torreyi* (S. Watson) S. Watson, *Bot. California* 1:233. 1876. TYPE: U.S.A. California: Santa Clara Co., New Almaden, 1865, *Torrey 109* (LECTOTYPE, designated by Munz (1941): GH; Isolectotype: NY).

Boisduvalia stricta (A. Gray) E. Greene, *Fl. Francisc.* 225. 1891.
Gayophytum strictum A. Gray, *Proc. Amer. Acad. Arts* 7:340. 1868;
non *Epilobium strictum* Muhl., 1813.

- Epilobium sect. Currania** (Munz) Hoch & Raven, *comb. nov.* BASIONYM: *Boisduvalia* Spach. sect. *Currania* Munz, *Darwiniana* 5: 127. 1941. TYPE: *Epilobium cleistogamum* (Curran) Hoch & Raven, selected by Raven & Moore (1965:251).

5. **Epilobium cleistogamum** (Curran) Hoch & Raven, *comb. nov.* BASIONYM: *Boisduvalia cleistogama* Curran, *Bull. Calif. Acad. Sci.* 1:12. 1884. *Oenothera cleistogama* (Curran) H. Lév., *Monogr. Oenothera* 304, 312. 1908. TYPE: U.S.A. California: Solano Co., near Elmira, "May" 1883, *Curran s.n.* (LECTOTYPE, designated by Raven & Moore (1965), CAS 126; Possible isolectotype: GH).

6. **Epilobium pygmaeum** (Speg.) Hoch & Raven, *comb. nov.* BASIONYM: *Oenothera pygmaea* Speg., *Anales Soc. Ci. Argent.* 48:46. 1899. *Boisduvalia pygmaea* (Speg.) Munz, *Physis* 11:278. 1933. TYPE: ARGENTINA. Chubut, Chonkenk-aik, 1 Aug. 1897, *Ameghino s.n.* (HOLOTYPE: LPS not seen).

- Boisduvalia glabella* (Nutt.) Walp., Repert. Bot. Syst. 2:89. 1843.
Oenothera glabella Nutt. in Torr. & A. Gray, *Fl. N. Amer.* 1:505.
1840; non *Epilobium glabellum* G. Forst., 1786.

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